

# **ELECTRONIC CONTROLLED HAIR STYLING APPLIANCE WITH DISPLAY DEVICE**

## **BACKGROUND OF THE INVENTION**

### **Field of the Invention**

**[0001]** The present invention relates to appliances, particularly hair styling appliances, having a programmable electronic control to permit control of the output temperature of the appliance. In addition, the present invention relates to display screens on these hair styling appliances to provide an accurate visual indication of operational features of the appliance.

### **Description of Related Art**

**[0002]** Many hairstyling appliances utilize heat to encourage hair to assume a new posture or desired style. For example, styling postures may include drying, straightening, curling, crimping, and the like. Heat may be applied to hair for styling by blowing hot air, for example, by using hair dryers or hot-air styling brushes, or by direct application of heat to the hair, for example by using styling irons or hot rollers, or other hair-setting tools.

**[0003]** Regardless of the hair-styling method, the application of too much or too little heat may result in unintended disadvantages. For example, overheating hair may cause hair to become damaged, dry, and brittle and in more severe cases, even burned. Too little heat may not achieve the desired results, that is, drying, straightening, curling, crimping, and the like.

**[0004]** The appropriate amount of heat needed to accomplish desired results depends, in part, upon the characteristics of a user's hair. Specifically, the thickness, natural curl and length of a user's hair may affect amount of heat necessary to achieve a desired style.

**[0005]** Accordingly, it would be an advantage to provide a hair styling appliance that permits a user to select and control the desired output temperature of that appliance. In

addition, it would be advantageous to provide the user with an accurate depiction of the desired output temperature via a display means.

### **SUMMARY OF THE INVENTION**

**[0006]** The present invention, therefore, seeks to satisfy the foregoing needs by providing a hair styling appliance having a programmable electronic control.

**[0007]** In one aspect of the present invention, a hair styling appliance is contemplated where the appliance has a selectable temperature setting that permits a user to control the desired output temperature.

**[0008]** Another aspect of the present invention contemplates providing an accurate visual representation the output temperature of the hair styling appliance on an electronic display on the appliance.

**[0009]** Yet another aspect of the present invention involves the inclusion of a shutoff/sleep mode of operation for the appliance such that when the appliance is left unattended or is not in operation for a proscribed period of time, the appliance automatically removes power flow to the heat source.

**[00010]** An even further aspect of the present invention is to provide a feature that will recall the last temperature setting of the appliance when the appliance is turned on after having been off.

**[00011]** And still another aspect of the present invention includes a locking mechanism or mode which prevents the desired settings from being accidentally, inadvertently or unintentionally changed.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[00012]** FIGURE 1 depicts the curling iron embodiment of the present invention;

**[00013]** FIGURE 2A illustrates the display screen at a low temperature setting.

**[00014]** FIGURE 2B illustrates the display screen at a medium temperature setting.

**[00015]** FIGURE 2C illustrates the display screen at a high temperature setting.

**[00016]** FIGURE 3 is a cross-sectional view of the handle portion of a curling iron embodiment of the present invention.

### **DETAILED DESCRIPTION OF THE INVENTION**

**[00017]** While the making and use of various embodiments of the present invention are discussed and contemplated herein, it should be appreciated that the present invention provides many inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed herein are therefore, merely illustrative of specific ways to make and use the invention and are not meant to limit the invention in any way. Accordingly, for the ease of discussion, curling iron embodiments are described below, as an exemplary appliance, and the description of a curling iron is not intended to limit the invention.

**[00018]** FIGURE 1 is a perspective view of a conventional curling iron **5**, having a handle portion **10** with a terminal end **15** that is connected to an electrical cord **20** and a styling portion **25** having a barrel **30** and a clamp **35** for positioning the hair against the barrel **30**. The handle portion **10** of the appliance comprises a control panel **45** having features including an on/off switch **50**, an on/off indicator **55**, and a temperature feature selection switch **60**. The temperature selection switch allows a user to select and control a desired output temperature for the appliance. The feature selection switch allows a user to enable one or more of the appliance features described herein.

**[00019]** In addition, in one embodiment of the present invention the control panel **45** has a display screen **65** which may provide for a visual indication of the operable features

and/or the output temperature of the appliance. The display screen 65 is preferably an LCD (Liquid Crystal Display) although other display means, such as LED (Light Emitting Diode) devices, may also be employed and are contemplated herein. The display screen 65 may optionally be equipped with a backlight to illuminate the display screen 65 while the appliance is switched on.

**[00020]** In one embodiment, the display screen provides a visual indication 70 of the output temperature, or power, of the device. Preferably the temperature is represented on the display screen 65 in the form of bars. For example a low temperature indication may be displayed as one to three bars as shown in Figure 2A, a mid-level temperature indication may appear as three to six bars as shown in Figure 2B, and a high temperature indication may appear as six or more bars as shown in Figure 2C. In an especially preferred embodiment of the present invention, there are twelve temperature levels, each indicated by an individual bar, indicated on the display screen 65. While it is preferred that the output temperature be indicated through the quantity and/or size of indicator bars, other methods, such as linear or radial representations, for indicating power or temperature magnitude may be employed. In addition, representations such as color indicators are also contemplated herein. Another optional feature of the display screen 65 involves a representation of the “heat-up” status of the appliance such that when the selected output temperature is reached, the user is notified by the display. In the especially preferred embodiment, this notification is indicated by illuminating each bar individually from the lowest to highest of the selected temperature and repeating until the selected temperature is reached. Ultimately, all the bars will be illuminated, thus indicating that the selected output temperature has been reached.

**[00021]** Another optional feature contemplated by the present invention includes a shutoff/sleep mode that removes power from the heat source of the appliance when the appliance remains idle or there is no activation of the appliance's controls within a given time period. By activating any of the appliance's controls the appliance is taken out of the shutoff/sleep mode. It is preferable for this feature to be represented on the display screen 65 when enabled. It is especially preferred that the representation of this enabled feature include a quarter moon, a clock-like icon, or other time symbolic indicator. An additional preferred optional feature includes an alarm to alert the user that the shutoff/sleep mode has been enabled and that power cutoff will soon occur. Preferably, such alarm includes a flashing or blinking light, although other visual or audio alarms may be utilized and are contemplated herein.

**[00022]** In certain embodiments, the present invention may include a last-setting-recall mode that recalls the last temperature setting selected by the user when the appliance is turned on. Typically this feature does not work if the unit has been unplugged from the AC power supply. However, one optional embodiment of the present invention includes a battery to maintain power to the last setting recall feature even when the appliance has been removed from an AC power source.

**[00023]** In certain embodiments, the appliances disclosed herein include a lock mode that allows the controls to be locked, thus preventing the desired settings from being accidentally or unintentionally changed. It is preferable for this feature to be represented on the display screen 65 when enabled. It is especially preferred that the representation of this enabled feature include a key or lock icon, or other symbolic indicator.

**[00024]** FIGURE 3 of the drawings is a cross-sectional view of the handle portion of the appliance shown in Figure 1. The elements numbered in Figure 3 correspond to the same

elements in Figures 1 and 2A-C. Also seen in Figure 3 are an internal electrical connection **80** that connects the internal circuitry of the device to the power cord **20**, and an electronic circuit board **85** which is connected to the internal electrical connection **80** (the connection is not shown). The back light **90** for the display screen **65** is also shown.

**[00025]** The foregoing description of an exemplary embodiment is for illustrative purposes only and is not intended to limit the scope of the claimed invention. Indeed, various modifications and applications for the described invention are intended to be within the scope of the present disclosure. In addition to the curling iron embodiment as described above, hair styling appliances such as flat irons, crimping irons, spiral irons or wands, curling-iron styling brushes, hair dryers, hot-air styling brushes, hot rollers or other hair-setting tools are contemplated by the present disclosure.